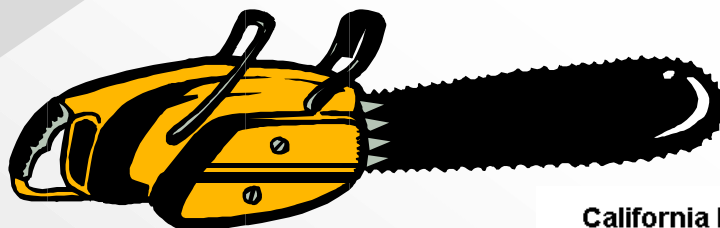
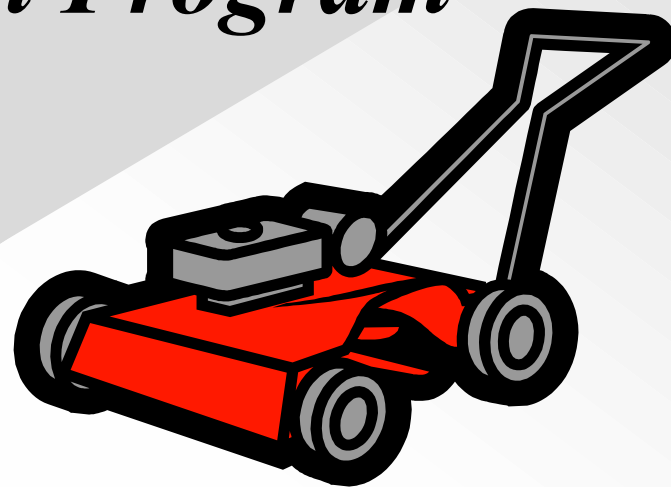
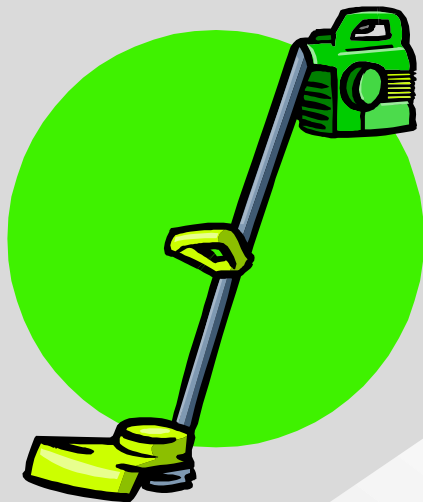


# *Small Engine Workshop*

## *Exhaust Emission Program*



California Environmental Protection Agency



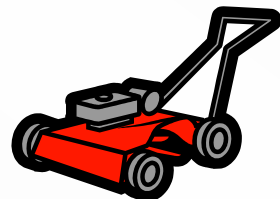
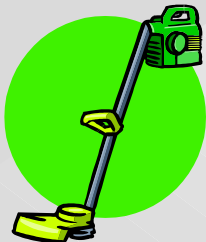
**Air Resources Board**

November 13, 2002

Mobile Source Control Division

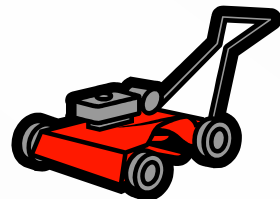
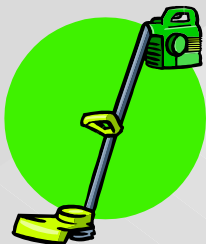
# *Overview of Presentation*

- Past Significant Events
- Amendment Objectives
- Current Testing
- Next Steps



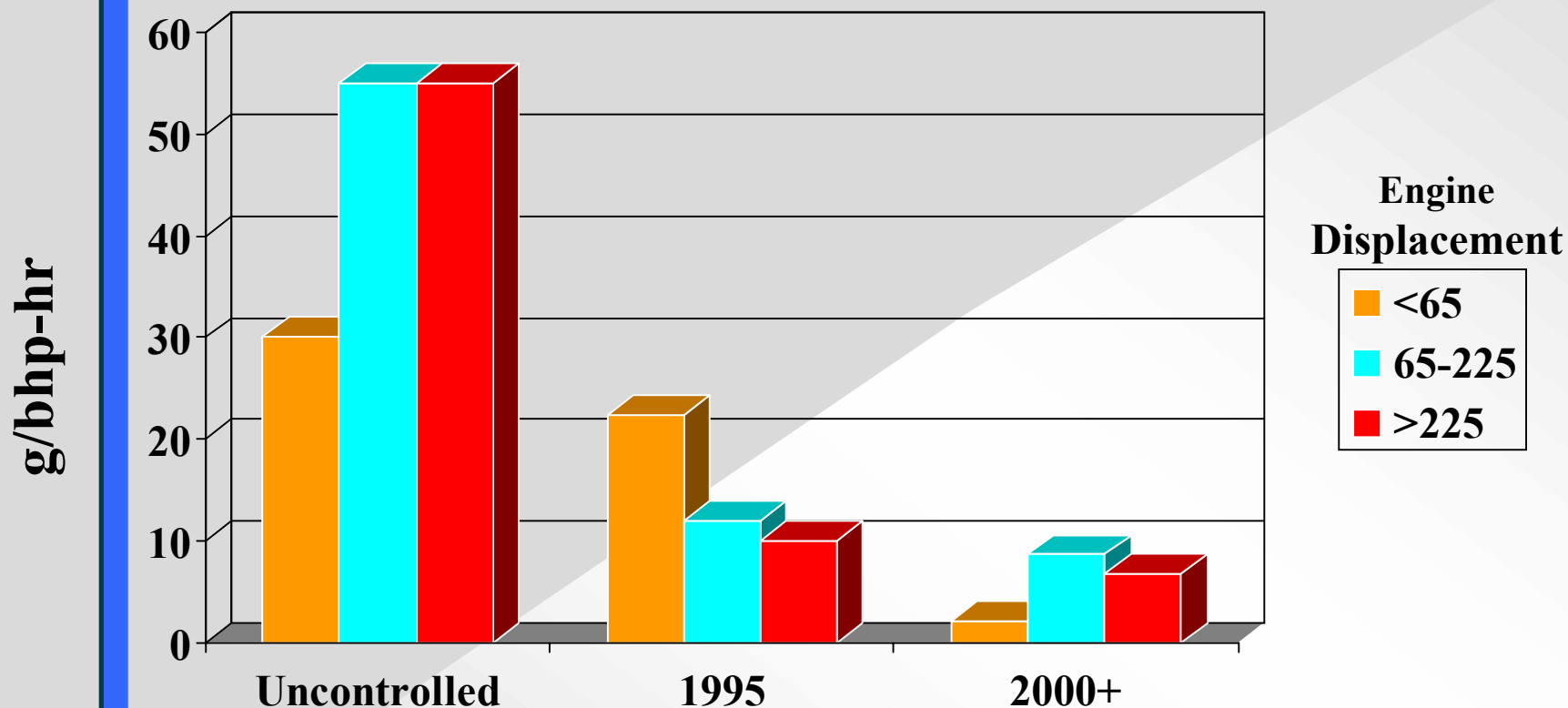
# *Significant Events*

- 1990 - 1st SORE Reg Adopted
- 1995 - 1st standards Implemented
- 1998 - SORE Reg Amendments
- 2000 - Durability Requirement Implemented
- 1998/2000 - U.S. EPA Finalized Regs
- 2003 - *New Amendments to be Proposed*



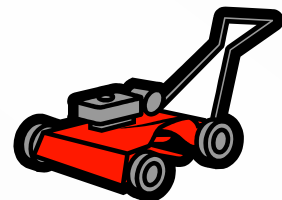
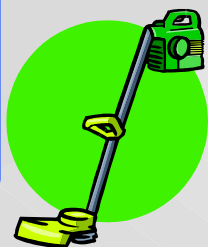
# *Reductions Already Achieved*

## HC+NOx

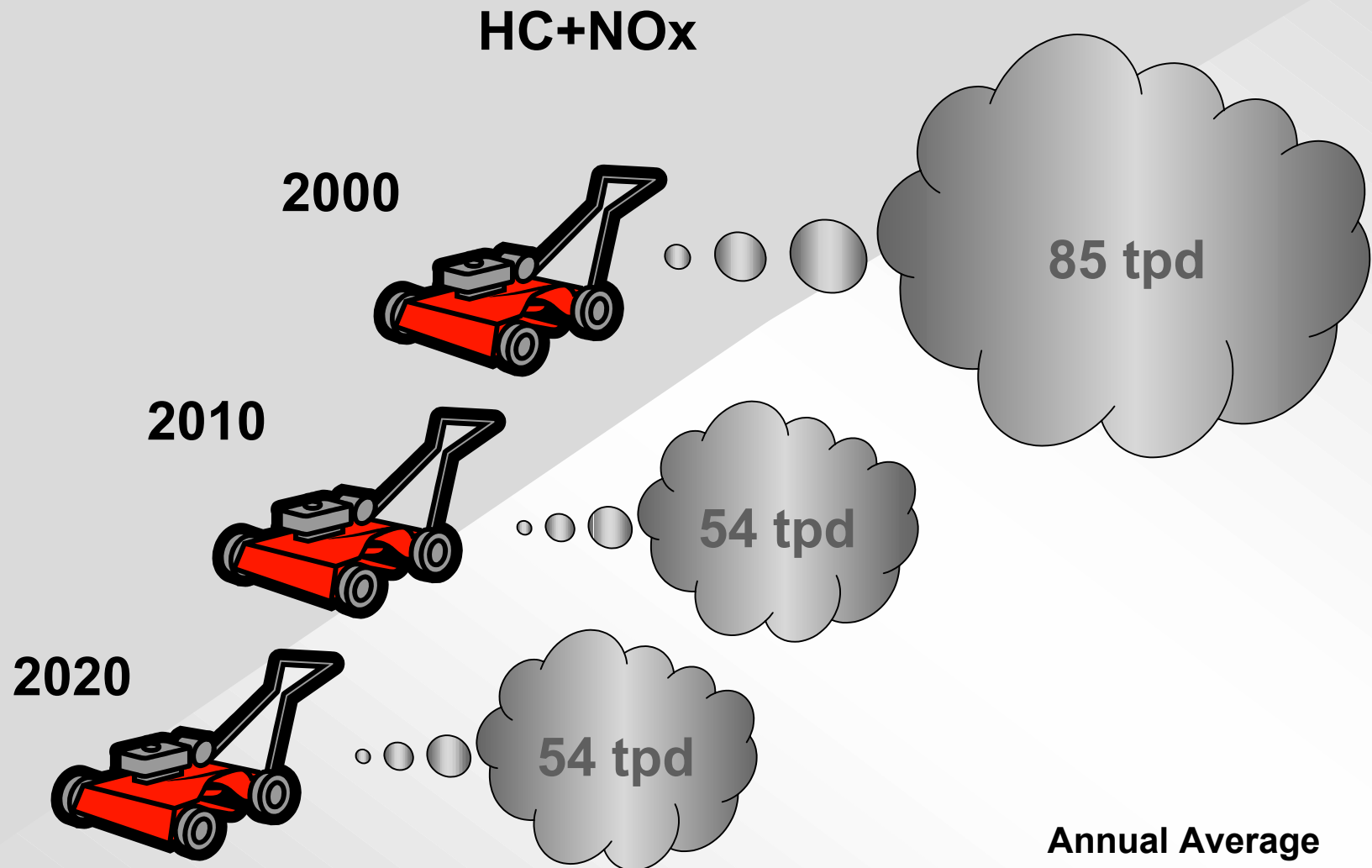


<65 cc Emissions Divided by a Factor of 10

Exhaust Emission Program

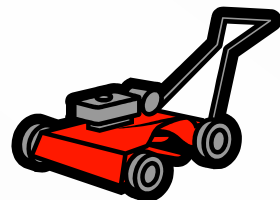
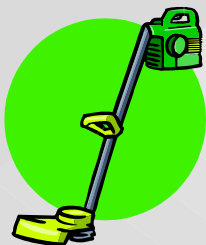


# *Small Engine Contribution*



# *New Amendment Objectives*

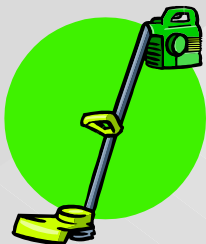
- Adopt U.S. EPA's 2005 "handheld" emission level
- Adopt catalyst based standards for the "non-handheld"
- Adopt optional low-emission standards
- Align ARB/U.S. EPA Test Procedures



# *Proposed Amendments*

## *0 - 65cc (“Handheld”)*

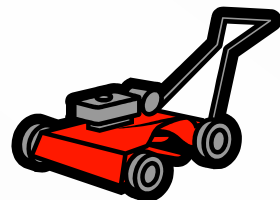
- Adopt U.S. EPA’s 37g/bhp-hr HC+NO<sub>x</sub> standard
  - Applicable less than 50cc
  - CO standard unchanged
- Change upper cc limit to 75cc



# *Proposed Amendments*

## *>75cc (“Non-Handheld”)*

- 50% reduction in HC+NO<sub>x</sub> standard
  - based on use of catalyst
  - 75 - <225cc: 6.0 g/bhp-hr
  - 225cc and above: 4.5 g/bhp-hr
- No change in durability period
- 2006 Implementation

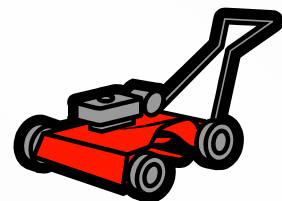




# *Proposed Amendments*

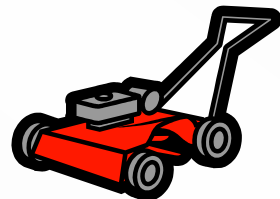
## *Optional Standards*

- Voluntary
- Cleanest Engines
- Incentives
- 2003-2004/5 MY- Comply with Tier 3 standards
- 2005/6 + MY- Comply with levels 50% of Tier 3 standards



# *Catalyst Test Program*

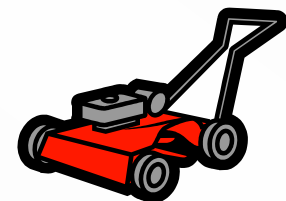
- SwRI
- Six Engine test program
  - Four 65-225cc
  - Two >225cc
- Engines equipped with catalysts
- Engines run over durability cycle for durability period
- Goal: 50% reduction



# *Catalyst Test Program*

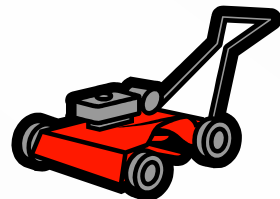
- SwRI
- Six Engine test program

No.	Max. Power (hp)	Disp. (cc)	Engine Spec.	Shaft	Cert HC+NO <sub>x</sub> (g/bhp-hr)
1&2	5	190	OHV	Vertical	9.3
3	6.75	195	OHV	Vertical	7.7
4	5.5	163	OHV	Horizontal	7.7
5	14.2	675	OHV, V-Twin	Vertical	8.5
6	13	389	OHV	Horizontal	6.2



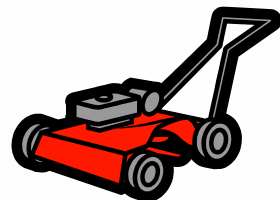
# *Catalyst Test Program*

- SwRI
- Six Engine test program
  - Four 65-225cc
  - Two >225cc
- Engines equipped with catalysts
- Engines run over durability cycle for durability period
- Goal: 50% reduction



# *Status of Test Effort*

- SwRI received catalysts
- As-received engine exhaust results for Engines A and B
- Currently working on catalyst development for Engines A and B
- March 2003 - Expected project completion date



# *Next Steps*

- Developing regulatory language
- Individual manufacturer meetings set for Nov 18-Dec 6
- Complete test program
- Board Hearing - June 2003
- Written comments by Dec. 13, 2002

